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American Society of Dentistry for Children

Annual Meeting

WILLARD HOTEL—WASHINGTON, D. C.

October 12–14, 1951

Friday—October 12th—8 P.M.

Executive Meeting

Saturday—October 13th—9:30–12 A.M.

Executive Council and State Delegates Meeting

Saturday—October 13th—1:30–4 P.M.

Scientific Section

"ORAL HABITS IN CHILDREN"

Dr. Russell Dixon, Dean of Howard University,
School of Dentistry—*Moderator*

Dr. W. Krogman—"Anthropological Appraisal of Dental Development"

Dr. M. Massler—"Significance of Oral Habits and Effects on the Developing Dentition"

Dr. I. N. Kugelmass—"The Pediatric Approach to Oral Habits in Children"

Dr. J. A. Salzman—"Orthodontic Approach to the Interception and Treatment of Oral Habits in Children"

Sunday—October 14th—10–12:30 A.M.

Table Clinics

Sunday—October 14th—2–5:30 P.M.

General Business Session and Election of Officers

Sunday—October 14th—7 P.M.

Dinner and Panel Discussion on

"COMMUNITY DENTAL PROGRAM PLANNING FOR CHILDREN"

Dr. Clemen C. Rault, Dean of Georgetown University,
School of Dentistry—*Moderator*

Dr. A. Gruebbel—"The Role of the Dental Society in Community Health Planning for Children"

Dr. J. Pelton—"The Role of U. S. Public Health Service in Community Dental Health Planning for Children"

Dr. L. Snedeker—"The Role of the Hospital in Community Dental Health Planning for Children"

Dr. J. Wisan—"The Role of the Community in Dental Health Planning for Children"

Wives, Dental Hygienists and Assistants are cordially invited to attend the Dinner and Discussion

Dentistry for Children is on the March*

HUGO M. KULSTAD, D.D.S., *President*
American Society of Dentistry for Children

I AM VERY happy for the privilege of speaking here in Washington, D. C., on this, our Third Annual National Children's Dental Health Day.

In choosing the title, "Dentistry for Children is on the March," I was thinking of the tremendous changes that have taken place in the past twenty-five years.

FIRST INTEREST IN DENTISTRY FOR CHILDREN

Nineteen-twenty-eight was the year the American Society for the Promotion of Dentistry for Children was formed. That was the year I closed my office in a small town in Oregon to go to the University of Southern California to take postgraduate work in children's dentistry, preventive orthodontics and diet and nutrition. In those days one was thought to be a little queer if he professed an interest in dentistry for children.

The first known meeting of a group of dentists interested in dentistry for children was held in Los Angeles in 1922. The meeting was reported in an article in the "Review of Dentistry for Children" in October 1934, and I quote:

> The day was given over in part to a scientific program and in part to discussion of organization. After considerable debate pro and con it was finally decided to organize, limiting the membership, however, to those whose practice was exclusively the care of children.
>
> There was but one thing to result from this; namely, its death, so the meeting in 1922 was really the first and the last.

Dr. Lon W. Morrey, of Chicago, was appointed Director of the Bureau of Public Relations of the American Dental Association in 1934. The program was principally one of promotion of dentistry for children through the development and distribution of educational material.

It was not until the meeting of the American Dental Association in the fall of 1927 that a second effort was made to organize those dentists interested in dentistry for children. As the result of considerable effort on the part of a few, the organization known as "The American Society for the Promotion of Dentistry for Children" was formed and began functioning in 1928.

In the April 1935 issue of the "Review of Dentistry for Children," while Dr. Charles A. Sweet was president of the American Society for the Promotion of Dentistry for Children, recognition was given to the part dentistry for children should play on May Day, which had been officially designated as Child Health Day by an Act of Congress (45—Statute 617, May 28, 1928).

In the May 1937 issue of the "Review" under the caption "May Day" there was published a series of three articles by Drs. William R. Davis, Walter T. McFall and Ralph L. Ireland.

For several years the annual meetings of the American Society for the Promotion of Dentistry for Children were so

* Presented at the meeting of the District of Columbia Dental Society, Washington, D. C., February 5, 1951.

poorly attended that they were held in a hotel bedroom. At the Atlantic City meeting last October standing room only was available at the final session. Dr. L. E. Hicok, president-elect of the California State Dental Association, made the statement that "the most interesting and best attended sessions at Atlantic City were on dentistry for children."

Educational Expansion

The College Committee was one of the first appointed after the Society was formed in 1928.

Mr. James Robinson once said of the problem of getting dental care for children, "We spend too much time with dentists who have established practices. We should turn to the embryo dentist and bring him out educated and inspired to concentrate on dental practice for children."

In 1928, 6 of 29 schools reporting on a questionnaire had chairs in dentistry for children, and by 1932 there were 13. However, as late as 1939 only 7 full professors and 10 assistant professors were reported in 32 schools. Even today there is still room for improvement.

In 1939, of 32 dental schools reporting, 9 gave some kind of postgraduate course in dentistry for children. Two schools gave graduate work leading to a degree. Today, short courses of refresher type are available in practically all dental schools and are usually joint efforts of dental societies and the health departments.

The consideration given to dentistry for children in dental colleges has resulted in much progress. Most schools now have full departments with teachers of professorial rank. In many of the new dental schools the children's clinics are lovely to behold and a pleasure for both child patient and student dentist. Graduates today are qualified to serve children and are doing an excellent job.

In 1938, a survey of state boards of dental examiners revealed that only five boards were in favor of asking questions on dentistry for children. Today, most states are requiring candidates to show knowledge of and proficiency in dentistry for children.

During 1928, there were twelve articles in all of the dental journals in the whole United States that could be identified as being in the field of dentistry for children. State dental associations, as well as their components, are now featuring dentistry for children on their programs and in their journals. Some states devote a full issue a year to all phases of dental care for children; others carry an article in almost every issue.

Membership Growth

The American Society of Dentistry for Children now has units in all of the larger states and is growing rapidly. The "Journal of Dentistry for Children" is one of the best and most widely read publications in dentistry.

In 1933, there were only 7 state units, with 230 members. By slow, hard work on the part of a few, the membership increased to 534 in 1941, but the war disrupted the progress. Graduates went directly into the armed forces, had no contact with children, and gave little thought to the field. All types of dental meetings were curtailed. This restriction interfered with membership drives, and by 1943 membership dropped to 477.

Following World War II the Society increased its membership rapidly: 1946—784, 1947—1,106, 1949—1,700 and in 1950—4,200. That is "marching on the double." The Society solicits membership of all who have an interest in dentistry

for children and who are members of the American Dental Association.

Washington is to be congratulated on having formed a fine active unit, which I predict will be one of the best in the United States. There is real talent here and some fine leaders.

Children as Patients

There are few men today who do not welcome children in their practice; they are the life blood of any practice. Almost all children are excellent dental patients, and seldom do we have to treat them differently from adults. Some of us used to say there were more dentists who were afraid of children than there were children who were afraid of dentists, but I am sure that this no longer is true. Modern technical procedures and anesthetic agents have removed pain and discomfort from dental care, and the child, as well as the dentist, has lost his dread and fear of the experience.

Progress, 1937–1945

Dr. Philip Jay, whose name is known to all interested in dentistry, published his first work on the correlation between Lactobacillus acidophilus in the saliva and dental caries in 1937. And this was the year our friend, Dr. Charles A. Sweet, reported on partial pulpectomy for exposed pulps.

Nineteen-forty was a banner year in dentistry for children. The name of our Society was changed at the annual meeting in Cleveland on September 9 to "The American Society of Dentistry for Children." Twenty-five members were present and voted. In 1944 the name of the publication of the Society was changed from "Review" to "Journal." An effort was initiated, in cooperation with the American Dental Association, to develop a specialty board of dentistry for children, but it was not until February 1949 that the first group of applicants was examined. Also, in 1940, studies on the topical application of sodium fluoride for control of caries were begun.

And, in 1942, Drs. B. G. Bibby and V. D. Cheyne, working independently, reported caries reductions from the use of topical fluorides. Drs. J. W. Knutson and Armstrong issued their first report on large scale studies on Minnesota school children during the year 1942.

As a result of work done by Drs. H. T. Dean, F. S. McKay and others on mottled enamel and fluoride waters, the first controlled studies on artificial fluoridation of public water supplies were started in 1945 in Michigan, New York and Wisconsin. In June 1950, on the basis of presumptive evidence supported by five years' experience in fluoride studies, the United States Public Health Service gave approval to the fluoridation of water as a partial control of dental caries.

The American Dental Association formed its Council on Dental Health in 1942, and, again, dentistry for children was recognized in its proper proportion by our parent body.

Dental Health Education

Up to now, I have been talking about progress in dentistry for children primarily within the dental profession. What else has been happening to indicate that "Dentistry for Children is on the March?" Many things—in most instances, the profession has been far ahead of the public in meeting its obligation.

The American Dental Association has directed most of its public education program efforts toward dentistry for children. The health education materials developed and distributed are almost exclusively in this field.

At the same time the dental profession

has done a few things to confuse the public. For instance, there is the gamut of names that has been used to indicate the first teeth: milk teeth, temporary teeth, baby teeth, deciduous teeth, foundation teeth, primary teeth, first teeth and possibly others! (*Ed. note:* The Journal of Dentistry for Children prefers the term "primary teeth.")

Research

Research has been directed to the prevention and control of dental disease, particularly in children. This research has been financed largely by the dental profession, with little outside support or encouragement. For example, the American Dental Association at each session of the National Congress had introduced and supported legislation to build, equip and man an Institute of Dental Research at Bethesda. After ten years, legislation which approved the building and equipping of such an Institute was passed. That was three years ago, and, to date, *no* funds have been appropriated to carry out the project.

The American Dental Association supplies funds to pay for much of the research that is carried on in Washington through fellowships. The dental profession is paying much of the bill—to try to discover ways of making its own services unnecessary.

Research has developed some truly wonderful discoveries. Sodium fluoride, if correctly applied, will reduce caries incidence on an average of 40 per cent. Fluoridation of community water supplies will reduce caries by 40 or 50 per cent, if the child has the benefit of this preventive measure from the prenatal period to about 10 or 12 years of age.

The medicated dentifrices, as well as the conventional types, have been proved to aid in the reduction of tooth decay.

Better eating habits, an adequate diet and the reduction of those foods and confections known to cause or contribute to dental disease have been shown to improve dental health in miraculous ways.

Dental Disease on the Increase

In spite of all we know and have done, dental disease is on the increase. Children are experiencing dental caries at the rate of $1\frac{1}{4}$ new areas per year. This is an increase of about $\frac{1}{4}$ area per child per year in the past ten years (approximately 20 per cent). For 25,000,000 or 30,000,000 children, this represents a sizeable amount of dental care.

Our draft officials recently have been forced again to lower dental requirements for induction. The rejection rate was so high at the requirement of twelve teeth (three upper and three lower in front that met and three upper and three lower in back that met) that the standards had to be lowered. The present wording is "two edentulous jaws restorable with artificial dentures." I am talking about our 19-to-25-year-old youngsters in this "land of plenty," with the most food and the best and most dentists of any country in the world!

During the past two years the dental profession has used a new approach to the problem of dental disease when dealing with the public. The emphasis, instead of being on early and regular dental care, research and dental health education, is on a three-point program that puts the responsibility right where it belongs.

First, those things that one can do about his own dental health:

a. We can prove that a good diet, eating those things that are beneficial and eliminating or reducing those that are harmful, will reduce caries and other dental disease and improve general health.

b. We can prove that personal mouth hygiene will reduce dental caries and that by ridding the mouth of fermentable materials as soon as possible after eating or drinking, dental decay can be reduced.

These two aspects of part one of the program cost *no* extra money, require *no* professional services and are entirely up to the individual.

Second, those services which the dental profession must provide:

a. Topical fluoride treatment.
b. Reparative services.

Third, the community's responsibility:

a. Better health education for persons of all ages through all available channels.
b. Fluoridation of water supplies.
c. Dental research to find additional ways to prevent and control dental disease.

A Challenge

If just a reasonable effort were made on the part of the public, both as individuals and as an organized society, the dental problem could be reduced to a vanishing point. The small amount of service still required could be well taken care of in the budgets of 90 per cent of our people. We could forget about costly and wasteful proposals for universal care through socialized programs.

Dentistry for children has been marching and will continue to do so. The dental profession has led the march toward better dental health at a price the public can pay. Let us challenge the public and the politicians to accept *their* responsibilities and *march with us!*

760 Market St.
San Francisco 2, California

The above photos were taken at our Annual Meeting of 1950 at Atlantic City. The gentleman at the extreme left of the group clinic picture is Stanley Spiro, whose interesting article will be found elsewhere in this issue. Morris Kelner, program chairman for our 1951 Meeting, is shown in the left photo, while Mike Cohen, of our Mass Unit, is the demonstrator in the picture on the right.

Report of the School and Dental Boards Committee of the American Society of Dentistry for Children*

Editor's note:

Because this report presents so many practical aspects and the answers to the questions or problems posed are so well substantiated by the references printed, we urge you to read it carefully.

The magnitude of this assignment is evident when it is noted that only the first three areas of the total field are reported upon in the accompanying article. A standard of accomplishment has certainly been set for the Committee which continues this work.

It is projects such as this one which enhance the prestige of the American Society of Dentistry for Children. Congratulations to the members of the Committee, its Chairman and to Bill Brown, Jr., all of whom labored so productively!

A. E. S.

THE ASSIGNMENT of the School and Dental Boards Committee is "to keep a continuing record of the time and degree of emphasis allotted to the teaching of pedodontics in the various dental schools of the United States, to cooperate with the Council on Dental Education of the American Dental Association in raising the requirements and standards of pedodontic teaching and in securing adequate emphasis for this subject in the dental curricula, and to maintain liaison with the various state boards of dental examiners in order to assure an evaluation of the candidate's previous preparation for pedodontics during all examinations for dental licensure." Following the 1948 meeting of the American Society of Dentistry, Dr. John C. Brauer was reappointed to this Committee and named Chairman for the year 1948–49 by President Alfred E. Seyler.

Since a potent motivation for improvement of the teaching of dentistry for children in the dental schools is the inclusion of questions on this subject in state licensure examinations, it was decided in the year 1947–48 to prepare a new list of questions to be submitted to all boards of dental examiners. The Chairman, Dr. Brauer, spent considerable time in the preparation of an initial list for his Committee to criticise. The correspondence of the Committee members indicated a desire to classify these questions in the various areas of essential knowledge of basic science and clinical practice and to complete a very thorough appraisal of published research and clinical observation in the documentation of the answers to the questions finally selected. On May 4th, 1949, Dr. Brauer resigned from the Committee due to his numerous new duties as Dean of the School of Dentistry at the University of Southern California. At his suggestion, President Seyler requested Dr. Kenneth A. Easlick to assume the chairmanship of the Committee. This chairmanship was accepted with the provision that adequate time and assistance be granted to the new Chairman and that President Seyler appoint himself to the vacancy created by Dr. Brauer's resignation.

Inasmuch as the decision had been

* Presented at the Annual Meeting, A. S. D. C., October 29, 1950.

reached earlier by the Committee to prepare a set of questions that would explore all areas of modern practice for child patients, that would be as scientifically accurate as current research permits in order to secure all possible prestige for the American Society of Dentistry for Children, that would be objective in nature, rather than the essay type of questions, in order to conform to modern trends in examinations and appraisals, and that would be thoroughly documented with references in order to defend adequately all answers as stated, the new chairman requested the assistance of Dr. W. E. Brown, Jr., in the preparation of an initial draft of questions, answers and references to be submitted for the criticism of the other members of the Committee. This permission was granted unofficially by Dr. Seyler.

Prior to the writing of any questions or answers it appeared sensible to prepare the outline of the major areas of information in which the candidate should be examined. This classification, which will be found attached, was prepared and submitted as a progress report at the meeting of the Society on October 3, 1949.

On April 14th, 1950, a letter was received from Secretary Keenan which stated that Dr. John Brauer again was too involved with new duties to assume the chairmanship of the School and Dental Boards Committee and that it was the pleasure of President Taub that Dr. Kenneth A. Easlick continue another year as chairman. This assignment was accepted with considerable reluctance.

Unfortunately the illness of three members of his immediate family throughout the summer has prevented the chairman from completing this assignment. Dr. William E. Brown, Jr., Assistant Professor of Dentistry (Pedodontics), was kind enough, however, to assume the amount of work that was involved in setting up questions, answering them and critically documenting the answers for the following sections of the outline:

I. Presenting Dentistry to the Child Patient
   A. Approach
   B. Introductory Appointment Routine

III. Operative Procedures
   E. Pulp management
      1. Cavity medication and lining
      2. Pulp capping
      3. Partial pulpectomy
      4. Complete pulpectomy and root canal filling
      5. Treatment of teeth with infected pulps
      6. Bleaching of discolored devital anterior teeth
      7. Root curettement and resection
      8. Fractured roots
      9. Displaced and "knocked-out" teeth.

Some experience with the tasks involved in this assignment indicates that considerable work is involved and that the activity probably can be carried out best at a school of dentistry where excellent library facilities are available. Because of this experience, the Chairman is willing to recommend that the personnel assigned to this Committee be appointed with such areas in mind and that the next chairman assign the development of definite blocks of questions to each member of his committee. Inasmuch as Dr. W. E. Brown, Jr., has assisted so much in the preliminary work and is so familiar with this pattern of developing material, the Chairman would like to suggest some consideration for Dr. Brown when the new member of this committee is selected.

In this report, attention probably should be called to the current activity of the Dentistry for Children Committee of the American Association of Dental Schools which, in cooperation with the U. S. Office of Education, is surveying critically the teaching of dentistry for children in the dental schools of the United States and Canada. Its recommendations are to be presented at the next annual meeting of the American Association of Dental Schools in March 1951.

Respectfully submitted

Frank F. Lamons '51
Ralph L. Ireland '52
John C. Brauer '53
William W. Demeritt '54
Kenneth A. Easlick '50, *Chairman*

Classification of Information to be Explored

I. Presenting Dentistry to the Child Patient
   A. Approach
   B. Introductory Appointment Routine
   C. Parent and Patient Education
II. Tooth Development, Morphology and Histology
III. Operative Procedures
   A. Morphological Considerations Pertinent to Procedures
   B. Restorative Materials
   C. Cavity Preparation and Restoration of Primary Teeth
   D. Cavity Preparation and Restoration of Young Permanent Teeth
   E. Pulp Management
      1. Cavity medication and lining
      2. Pulp capping
      3. Partial pulpectomy
      4. Complete pulpectomy and root canal filling
      5. Treatment of teeth with infected pulps
      6. Bleaching discolored devital anterior teeth
      7. Root curettement and resection
      8. Fractured roots
      9. Displaced and "knocked-out" teeth
IV. Disease of Oral Soft Tissues
V. Control Measures and Instruction in Home Care of Mouth
VI. Radiology, Diagnosis and Treatment Planning
VII. Health, Growth and Development Problems Pertinent to the Children's Dentist
   A. Radiological Study of Chronological and Physiological Age
   B. Physical Appraisal of Children
      1. Normal child
      2. Mal-developed and sick child
      3. Dental conditions found in disease syndromes
   C. Management of the Patient with Oral Clefts and Speech Problems
   D. Nutritional and Dietetic Problems
   E. Occlusion
      1. Etiology and diagnosis
      2. Anterior arch mal-relations
      3. Posterior arch mal-relations
   F. Preventive and Palliative Orthodontic Treatment
   G. Anomalies of Dentition—Diagnosis and Treatment
      1. Variations in exchange of dentitions
      2. Variations in number of teeth

3. Variations in shape of teeth
4. Variations in structure of teeth
5. Variations in position of teeth

VIII. Office Management

QUESTIONS, ANSWERS AND REFERENCES ON DENTISTRY FOR CHILDREN

I. Presenting Dentistry to the Child Patient

A. Approach

(+) 1. A well-developed child should begin his visits to the dentist at about 30 months to three years of age

Easlick, K. A.: The dentist's management of young children. Internat. J. Orthodont. and Dent. Child., **21**: 76-88, Jan. 1935.
Evans, L. H.: A child's first visit to the dentist. Mich. S. Dent. Soc. J., **25**: 128-30, May, 1941.

2. Of the ten following technics for the dental office it was concluded from a scientific questionnaire that five were detrimental to the management of elementary school children. The five detrimental technics are:
( ) Giving the child his extracted teeth
(×) Staring at the child while working on his teeth
(×) Comparing the child with other children
( ) Explaining the dentist's instruments and what each one does
(×) Getting out a large number of instruments on the bracket table
( ) Having toys or games in the office with which to play
( ) Permitting a child to watch the operation in the mirror
(×) Telling the child's parents that he is a poor patient
(×) Scolding the child for misbehavior
( ) Taking radiographs

Olson, W. C.: Reactions of children to dental procedures. Ann Arbor, The Author, 1942. 1 p.

(+) 3. Scolding a child is ordinarily an ineffective method to secure his cooperation

Olson, W. C.: Reactions of children to dental procedures. Ann Arbor, The Author, 1942. 1 p.

(−) 4. A child who asks many questions at the beginning of his dental appointment may be expected to be a behavior problem

McSwain, E. T.: The dentist and his young patient. J. Dent. Educ., **11**: 216-23, Apr. 1947.

(−) 5. Immediate response to an adult's commands should be expected from a pre-schoo child in a dental chair

Ireland, R. L.: Introducing dentistry to the child. Am. Dent. A. J., **30**: 280-6, Feb. 1, 1943.

(−) 6. When working for elementary school children it is good practice for the operator to talk "baby talk" to them

Ireland, R. L.: Introducing dentistry to the child. Am. Dent. A. J., **30**: 280-6, Feb. 1, 1943.
Easlick, K. A.: Operative dentistry and the three-year-old patient. N. Y. 2nd Dist. Dent. Soc. J., **25**: 495-503, May 1940.

(+) 7. Children desire their extracted teeth as souvenirs

Olson, W. C.: Reactions of children to dental procedures. Ann Arbor, The Author, 1942. 1 p.

(−) 8. Local anesthesia is a necessary adjunct for the successful management of most frightened children during routine cavity preparation

Hartsook, J. T.: The child and the dentist. J. Dent. Child., **13**: 20-2, 1st Quar. 1946.

(−) 9. Children should not be told something is going to "bother" even though it will

HARTSOOK, J. T.: The child and the dentist. J. Dent. Child., **13:** 20-2, 1st Quar. 1946.
IRELAND, R. L.: Introducing dentistry to the child. Am. Dent. A. J., **30:** 280-6, Feb. 1, 1943.
OLSON, W. C.: Reactions of children to dental procedures. Ann Arbor, The Author, 1942. 1 p.

B. Introductory Appointment Routine

(+) 1. A prophylaxis is an excellent procedure with which to introduce dentistry during a child's first appointment

EASLICK, K. A.: The dentist's management of young children. Internat. J. Orthodont. and Dent. Child., **21:** 76-88, Jan. 1935.
IRELAND, R. L.: Introducing dentistry to the child. Am. Dent. A. J., **30:** 280-6, Feb. 1, 1943.

(+) 2. Complicated operative procedures should be avoided during the first appointment, if possible

EASLICK, K. A.: The dentist's management of young children. Internat. J. Orthodont. and Dent. Child., **21:** 76-88, Jan. 1935.

(−) 3. Toothbrushing instruction to a preschool child is wasted effort because he cannot understand it

EASLICK, K. A.: Operative dentistry and the three-year-old patient. N. Y. 2nd Dist. Dent. Soc. J., **25:** 495-503, May 1940.

(−) 4. Treatment of toothaches in preschool children should be avoided at the initial appointment because of the discomfort invoked by the dentist

EASLICK, K. A.: The dentist's management of young children. Internat. J. Orthodont. and Dent. Child., **21:** 76-88, Jan. 1935.

(+) 5. Explanation and demonstration of equipment and instruments is good practice at the first appointment of a preschool child

EASLICK, K. A.: The dentist's management of young children. Internat. J. Orthodont. and Dent. Child . **21:** 76-88, Jan. 1935
IRELAND, R. L.: Introducing dentistry to the child. Am. Dent. A. J., **30:** 280-6, Feb. 1, 1943.

(−) 6. Rewards for good behavior usually are effective in promoting acceptable behavior in the dental office

EASLICK, K. A.: The dentist's management of young children. Internat. J. Orthodont. and Dent. Child., **21:** 76-88, Jan. 1935.
IRELAND, R. L.: Introducing dentistry to the child. Am. Dent. A. J., **30:** 280-6, Feb. 1, 1943.

III. OPERATIVE PROCEDURES

E. Pulp Management in Primary and Young Permanent Dentitions

1. Cavity Medication and Lining

1. Ammoniacal silver nitrate on or in a tooth

(*Check the correct answers*)

( ) Is placed in a dry area and permitted to remain there for five minutes and then precipitated

(×) Is reducible by formalin or eugenol
(×) Is alkaline

GORDON, S. M., AND SHAND, E. W.: Ammoniacal silver nitrate. Am. Dent. A. J., **29:** 530-40, Mar. 1933. (p. 539.)
IRELAND, R. L.: Ammoniacal silver nitrate as a sterilizing agent for deep-seated decay in deciduous teeth. Rev. Dent. Child., **6:** 8-10, 1st Quar. 1939.

(−) 2. The reduction of ammoniacal silver nitrate solution over the nearly exposed pulps of primary teeth is highly irritating to the pulp tissue even when eugenol is used as the reducing agent

ZANDER, H. A., AND BURRILL, D. Y.: The penetration of silver nitrate solution into dentin. J. Dent. Res., **22:** 85-9, Apr. 1943. (p. 89.)

(−) 3. When the pulp is not quite exposed, the dentin surface of a fractured crown of a young incisor should be covered by varnish and the child dismissed for a period of observation

HARTSOOK, J. T.: Management of young anterior teeth which have been involved in accidents. Am. Dent. A. J., 37: 554-64, Nov. 1948. (p. 556.)

4. A child ten years of age received a severe blow on the upper right central incisor about an hour ago. The crown is fractured and considerable dentin is exposed but the pulp is not quite exposed

(Check the correct procedures)

(×) Phenolize and cover exposed dentin with a sedative dressing and then cover tooth with silicate cement in crown form
( ) Inform the parent and patient that you will want to watch the case for a num- of weeks and then place some sort of restoration
(×) Make a differential vitality test with the electric pulp tester
(×) Take a radiograph to determine the condition of the bone and the probability of a root fracture

HARTSOOK, J. T.: Management of young anterior teeth which have been involved in accidents. Am. Dent. A. J., 37: 554-64, Nov. 1948. (p. 556.)

2. *Pulp Capping*

(−) 1. Normal pulp tissue will react to calcium hydroxide and zinc oxide-eugenol in identical patterns

(−) 2. When applied directly to vital pulp tissue, phenol produces a damaging necrosis which delays pulp healing.

3. When a healthy pulp is capped with calcium hydroxide following exposure, one may expect the following reactions:

(Check the correct answers)

(×) Production of an area of necrosis opposite the site of exposure within 24 hours
( ) After two weeks the pulp exhibits an area of necrosis opposite the site of exposure with a generalized hyperemia of the pulp
( ) For at least a 12-week period, the calcium hydroxide fails to stimulate the walling off of the pulp by a continuous dentin barrier
( ) For a long period of time, the pulp exhibits a chronic inflammatory reaction at the site of the exposure

4. When a healthy pulp is capped with zinc oxide-eugenol paste following exposure, one may expect the following reactions:

(Check the correct answers)

(×) Production of an area of necrosis opposite the site of exposure within 24 hours
( ) Within two weeks, pulp tissue responds by the formation of a new odontoblastic layer
(×) For at least a 12-week period, zinc oxide-eugenol paste fails to stimulate the walling off of the pulp by a continuous dentin barrier
(×) For a long period of time, the pulp exhibits a chronic inflammatory reaction at the site of the exposure

ZANDER, H. A., AND GLASS, R. L.: The healing of phenolized pulp exposures. Oral Surg., Oral Med. and Oral, Path., 2: 803-10, June 1949.

3. *Partial Pulpectomy*

1. For a child five years of age with a vital exposed pulp in a primary molar the preferable treatment would be to

(*Check the correct answers*)

( ) Extract the tooth
( ) Permit the tooth to remain in the arch without attention
(×) Complete a partial pulpectomy
( ) Do a complete pulpectomy

EASLICK, K. A.: Management of pulp exposure in the mixed dentition. Am. Dent. A. J., **30**: 179–87, Feb. 1, 1943. (p. 105.)

2. A healthy child of eight years who appears in the dental office with a fractured permanent central incisor, has a pulp that is widely exposed and vital. The radiographs show the root ends to be incompletely calcified. What procedure should be recommended?

(*Check the correct answers*)

( ) Extract the tooth
( ) Remove the entire pulp
( ) Cap the pulp
(×) Complete a partial pulpectomy (remove part of the vital pulp)

ELLIS, R. G.: The classification and treatment of injuries to the teeth of children. 2nd ed., Chicago. The Year Book Publishers, 1946. 256 p. (p. 101.)

3. The criterion of success in a partial pulpectomy in a permanent central incisor would resolve itself into whether

(*Check the correct answers*)

(×) The root end, if not completed, would complete its full development
( ) The root end remained open if not fully developed when treatment was started
( ) Pulp stones were in evidence several months after treatment

BROWN, W. E., JR.: The pulpotomy technic for the management of vital exposed pulps in primary and young permanent teeth. Mich. Univ. School of Dent. Alumni Bul., **43**: 14–6, Aug. 1947.
EASLICK, K. A., WILBUR, H. M., AND CROWLEY, MARY C.: Partial pulpectomy: a treatment for vital exposed pulps in young permanent teeth. Am. Dent. A. J., **28**: 365–73, Mar. 1941.

4. In a partial pulpectomy of a permanent central incisor in which the root end is approximately two-thirds developed, the

(*Check the correct answers*)

( ) Principal objective is to devitalize the pulp completely, i.e., eliminate all future vitality of the pulp by the use of some devitalizing agent
(×) Principal objective is to retain the pulp vitality in order to permit further function of the odontoblasts and cementoblasts and the continued development of the root to its full maturity
( ) The use of paraformaldehyde paste or arsenic is a treatment to permit future normal function of the odontoblasts

EASLICK, K. A.: Management of pulp exposure in the mixed dentition. Am. Dent. A. J., **30**: 179–87, Feb. 1, 1943.
EASLICK, K. A., WILBUR, H. M., AND CROWLEY, MARY C.: Partial pulpectomy: a treatment for vital exposed pulps in young permanent teeth. Am. Dent. A. J., **28**: 365–73, Mar. 1941.

(−) 5. The root canals of young permanent incisors are too large for the partial pulpectomy technic to be employed

EASLICK, K. A., WILBUR, H. M., AND CROWLEY, MARY C.: Partial pulpectomy: a treatment for vital exposed pulps in young permanent teeth. Am. Dent. A. J., **28**: 365–73, Mar. 1941.

(−) 6. Escharotic drugs, such as phenol, are contra-indicated for use to stop the hemorrhage of amputated pulp stumps

Brown, W. E., Jr.: The pulpotomy technic for the management of vital exposed pulps in primary and young permanent teeth. Mich. Univ. School of Dent. Alumni Bul., **48:** 14-6, Aug. 1947.

Zander, H. A., and Glass, R. L.: The healing of phenolized pulp exposures. Oral Surg., Oral Med. and Oral Path., **2:** 803-10, June 1949.

(−) 7. An aseptic technic is unnecessary when performing a pulp amputation for a primary tooth

Brown, W. E., Jr.: The pulpotomy technic for the management of vital exposed pulps in primary and young permanent teeth. Mich. Univ. School of Dent. Alumni Bul., **48:** 14-6, Aug 1947.

Easlick, K. A., Wilbur, H. M., and Crowley, Mary C.: Partial pulpectomy: a treatment for vital exposed pulps in young permanent teeth. Am. Dent. A. J., **28:** 365-73, Mar. 1941.

(−) 8. Usually one should extract a fractured permanent incisor whose pulp is protruding and whose root end is incompletely calcified

Hartbook, J. T.: Management of young anterior teeth which have been involved in accidents. Am. Dent. A. J., **37:** 554-64, Nov. 1948.

(+) 9. The application of calcium hydroxide as a paste over the vital pulp stumps, left in the root canals of a young permanent tooth, following a partial pulpectomy, usually is followed by a deposition of dentin in a few months

Brown, W. E., Jr.: The pulpotomy technic for the management of vital exposed pulps in primary and young permanent teeth. Mich. Univ. School of Dent. Alumni Bul., **48:** 14-6, Aug. 1947.

Restarski, J. S.: Clinical and histologic studies of partial pulp amputation. Bur., **33:** 59-69, Aug. 1939.

(−) 10. The presence of a band of calcification across the root canals six months following a vital partial pulpectomy indicates an unsuccessful result

Brown, W. E., Jr.: The pulpotomy technic for the management of vital exposed pulps in primary and young permanent teeth. Mich. Univ. School of Dent. Alumni Bul., **48:** 14-6, Aug. 1947.

Partial Pulpectomy Problem

A five-year-old boy has an exposed pulp in a maxillary 2nd primary molar; there is no history of previous toothache; the Eastman No. 2 bite-wing exhibited no indication of bone destruction between the roots of this tooth; the area of exposed pulp was approximately "pin-point" in size.

In the following groups of problems, involving the amputation of the pulp of this five-year-old's primary molar, check the correct statements:

(11) *Morphological Considerations*

(a) When gaining wide access to the pulp chamber from the occlusal surface of this tooth, the operator usually should expect to expose

( ) a. Two pulp horns
( ) b. Three pulp horns
( ) c. Four pulp horns
(X) d. Five pulp horns
( ) e. Six pulp horns

Nuckolls, James: Morphology of the deciduous teeth. p. 358-410. (In McBride, W. C., ed. Juvenile Dentistry. 3rd ed., Philadelphia, Lea and Febiger, 1941. 414 p.)

(b) The type of film which will delimit best the root morphology of this tooth is

(X) a. The No. 2 Eastman bite-wing
( ) b. No. 0 or No. 1 Eastman bite-wing
( ) c. Periapical film
( ) d. Lateral jaw film
( ) e. Posterior occlusal film

Easlick, K. A.: Partial pulpectomy technic for primary and young permanent teeth. Ann Arbor, University of Michigan, 1949. 3 p. processed.

(c) The number of root canals usually found in this tooth is
( ) a. Two
( ) b. Three
(×) c. Four
( ) d. Variable between 2, 3 or 4
( ) e. Variable between 1, 2, 3, or 4

NUCKOLLS, JAMES: Morphology of the deciduous teeth. p. 358–410. (In McBride, W. C., ed. Juvenile Dentistry. 3rd ed., Philadelphia. Lea and Febiger, 1941. 414 p.)

(12) *Operative Considerations*

(a) To secure profound anesthesia for the amputation of the pulp in this primary molar one should
( ) a. Give a zygomatic block
(×) b. Infiltrate buccally and lingually
( ) c. Give an inferior dental block
( ) d. Infiltrate in muco-buccal fold only
( ) e. Give a naso-palatine block

EASLICK, K. A.: Partial pulpectomy technic for primary and young permanent teeth. Ann Arbor, University of Michigan, 1949. 3 p. processed.

(b) To maintain asepsis while performing the partial pulpectomy one should
( ) a. Keep dry cotton rolls in the muco-buccal fold
(×) b. Isolate the tooth to be operated with a rubber dam
( ) c. Isolate the cuspid, 1st molar, and 2nd molar in that quadrant with a rubber dam
( ) d. Use a water spray to clear the operative field
( ) e. Use compressed air to keep out saliva

EASLICK K. A.: Management of pulp exposure in the mixed dentition. Am. Dent. A. J., **30**: 179–87, Feb. 1, 1943. (p. 184.)

(c) After the partial pulpectomy has been completed, calcium hydroxide placed over the pulp stumps, and a cement base placed, the silver amalgam restoration should be placed
(×) a. Immediately
( ) b. In approximately two weeks after making certain the tooth is comfortable
( ) c. In six weeks when the check-up radiograph shows no indication of bone destruction between the roots
( ) d. In six months when the check-up radiograph shows bonds of calcification across the root canals

EASLICK, K. A.: Partial pulpectomy technic for primary and young permanent teeth. Ann Arbor, University of Michigan, 1949. 3 p. processed.

(13) *Arresting Hemorrhage*

In addition to the use of phenol on a cotton pellet to wipe out the pulp chamber, the following technics may be recommended for the scientific control of persistent hemorrhage following the amputation:
( ) a. Packing into the pulp chamber with pressure, cotton pellets saturated with 1:500 zinc chloride solution
( ) b. Copious lavage with a three per cent solution of hydrogen peroxide
(×) c. Packing into the pulp chamber with pressure, cotton pellets saturated with adrenalin chloride, 1:1000 solution
(×) d. Packing into the pulp chamber with pressure, cotton pellets saturated with a one per cent solution of neosynephrine
( ) e. Searing the amputated surfaces of the pulp stumps with a red-hot instrument

EASLICK, K. A.: Partial pulpectomy technic for primary and young permanent teeth. Ann Arbor, University of Michigan, 1949. 3 p., processed.

(14) *The pH of Calcium Hydroxide*

(×) a. Calcium hydroxide is so alkaline in reaction that pathogenic bacteria cannot survive in it

( ) b. Calcium hydroxide is so acid in reaction that pathogenic bacteria cannot survive in it

( ) c. Calcium hydroxide is so bland in its reaction that it permits the growth of pathogenic organisms unless one's stock is carefully protected

(×) d. Calcium hydroxide is so alkaline that it promptly necrotizes the surface of the pulp which it contacts

( ) e. Calcium hydroxide is so bland to soft tissue that it stimulates a prompt repair action on the surface of the pulp which it contacts

ZANDER, H. A.: Reaction of the pulp to calcium hydroxide. J. Dent. Res., **18**: 373-9, Aug. 1949.
ZANDER, H. A., AND GLASS, R. L.: The healing of phenolized pulp exposures. Oral Surg., Oral Med. and Oral Path., **2**: 803-10, June 1949.

(15) *Reactions to Capping Materials*

(×) a. Within two weeks, pulp tissue, covered with calcium hydroxide, responds by the formation of a new odontoblastic layer

( ) b. Within two weeks, pulp tissue, covered with zinc oxide-eugenol, responds by the formation of a new odontoblastic layer

(×) c. Within four weeks, pulp tissue, covered with calcium hydroxide, responds by the deposition of new dentin

( ) d. Within four weeks, pulp tissue, covered with zinc oxide-eugenol, responds by the deposition of new dentin

(×) e. For a long period of time, pulps, treated with zinc oxide-eugenol exhibit a chronic inflammatory reaction at the site of the amputation

ZANDER, H. A., AND GLASS, R. L.: The healing of phenolized pulp exposures. Oral Surg., Oral Med. and Oral Path., **2**: 803-10, June 1949.

(16) *Operative Prognosis*

During the partial pulpectomy operation utilized to preserve this patient's tooth the following observations would lead one to expect a favorable outcome:

(×) a. Maintenance of asepsis throughout the opening of the pulp chamber, amputation of the pulp, and sealing off of the pulp

(×) b. Detection of the slight area of pulp tissue exposed previously by caries

(×) c. Copious red hemorrhage encountered following the amputation of the coronal pulp

(×) d. The covering of the amputated pulp stump with a calcium hydroxide paste

( ) e. The use of sterile water in the preparation of the pulp chamber paste

BROWN, W. E., JR.: The pulpotomy technic for the management of vital exposed pulps in primary and young permanent teeth. Mich. Univ. School of Dent. Alumni Bul., **48**: 14-6, Aug. 1947.
ZANDER, H. A., AND GLASS, R. L.: The healing of phenolized pulp exposures. Oral Surg., Oral Med. and Oral Path., **2**: 803-10, June 1949.

(17) *Long Range Outcome*

If this operated molar were to be observed in a series of annual radiographs for the succeeding five years, the following diagnostic conditions of successful outcome might be detected by an alert operator:

(×) a. Normal schedule of root resorption

(×) b. Maintenance of normal periapical bony architecture

(×) c. Presence of calcified bar in root canals

( ) d. Exfoliation of tooth between eight and ten years

( ) e. Tendency to ankylosis of roots

BROWN, W. E., JR.: The pulpotomy technic for the management of vital exposed pulps in primary and young permanent teeth. Mich. Univ. School of Dent Alumni Bul., **48**: 14-6, Aug. 1947.

4. Complete Pulpectomy and Root Canal Filling

(+) 1. Scientific procedure demands two successive negative cultures during treatment before the root canal of a devital permanent tooth is filled.

SOMMER, R. F.: Essentials for successful root resection. Am. J. Orthodont. and Oral Surg. (Oral Surg. Sect.), **32**: 76-100, Feb. 1946. (p. 85.)

(+) 2. Strains of viridans or anhemolytic streptococci most frequently are isolated from the infected root canals of teeth

OSTRANDER, F. D., AND CROWLEY, MARY C.: The effectiveness of clinical treatment of pulp-involved teeth as determined by bacteriologic methods. J. Endodont., **3**: 6-12, Jan. 1948.

3. If a devital maxillary central incisor with a fractured mesio-incisal angle in a 9-year-old's mouth were to be treated by scientific root surgery, one should open into the pulp chamber through

(*Check the correct answers*)

( ) a. The fractured surface at any convenient spot
( ) b. The lingual surface at any convenient spot
(×) c. A spot nearest the pulp chamber in the cingulum area
( ) d. A spot on the fractured surface adjacent to the incisal edge
( ) e. A spot on the fractured surface of the dentin nearest the pulp

GROSSMAN, L. I.: Root canal therapy. 3rd ed., Philadelphia, Lea and Febiger, 1950. 368 p. (p. 203-4.)

4. The diameter of the opened pulp chamber in a maxillary central incisor of a 9-year-old will be widest

(*Check the correct answers*)

( ) a. Mesiodistally in the incisal third of the crown
(×) b. Mesiodistally in the middle third of the crown
( ) c. Mesiodistally in the gingival third of the crown
( ) d. Labiolingually in the middle third of the crown
( ) e. Labiolingually in the gingival third of the crown

ZEISS, R. C., AND NUCKOLLS, JAMES: Dental anatomy. St. Louis, C. V. Mosby, 1949. XIII + 486 p. (p. 53.)

5. To treat the root canal of a devital central incisor in a 9-year-old, with due consideration of the periapical tissue, a scientific dentist would select one of the following drugs to eliminate an infection of viridans streptococci:
( ) a. Eugenol
(×) b. Chloroazodin (Azochloramid)
( ) c. Phenolated iodine solution
( ) d. Cresolated formaldehyde
(×) e. Camphorated paramonochlorophenol
(×) f. Aqueous iodine solution with ionic medication
(×) g. Penicillin—streptomycin
( ) h. Beechwood creosote

OSTRANDER, F. D.: Drug therapy in endodontia: questions and answers. Am. Dent. A. J., **39**: 238-43, Aug. 1949.

6. Prior to the insertion of the final root canal filling in a central incisor of a 9-year-old, the scientific operator should make certain that

(*Check the correct answers*)

( ) a. The tooth is insensitive to percussion
( ) b. The dressings removed from the root canal exhibit no odor of putrescence

( ) c. He secures at least one negative bacterial culture
(×) d. He obtains two successive negative bacterial cultures
( ) e. The check-up radiograph exhibits no area of apical radiolucence

GROSSMAN, L. I.: Root canal therapy. 3rd ed., Philadelphia, Lea and Febiger, 1950. 368 p. (p. 281.)

7. Granting that the drug treatment of the root canal of a maxillary central incisor in a 9-year-old has been successful and that the scientific operator is about to fill the canal, he should

(*Check the correct answers*)

( ) a. Plan to overfill the canal and then perform a root resection or periapical curettage
( ) b. Fill the canal with a number of small gutta percha points carefully condensed against the periphery to assure a tight seal
( ) c. Fill the canal with a thick root canal paste and not attempt to use a point
(×) d. Prepare a special, large gutta percha root canal point, using the radiograph as his guide for width and length
( ) e. Select a large silver root-canal point and trim it to fit, using the radiograph as his guide for width and length

GROSSMAN, L. I.: Root canal therapy. 3rd ed., Philadelphia, Lea and Febiger, 1950. 368 p. (p. 288–90.)

8. Providing that the treatment and filling of the root canal of a central incisor in a nine-year-old has been successful, the operator may expect the following observations to be made in a check-up periapical radiograph taken at 11 years of age:

(*Check the correct answers*)

(×) a. Completion of the calcification of the apex of the root
(×) b. Completion of development of the periapical lamina dura
(×) c. Development of a periodontal membrane of normal thickness and outline
(×) d. Development of normal periapical bone trabeculae
( ) e. Incomplete calcification of the apex of the root

BRUNO, SEBASTIAN: Tissue changes following root canal therapy. Tufts Dent. Outlook, **21:** 8–13, Apr. 1947.
HATTON, E. H.: Histologic studies of living tissue reactions associated with pulpless teeth that may be taken as evidence of satisfactory healing. Am. Dent. A. J., **18:** 1502–10, Aug. 1931.
GROSSMAN, L. I.: Root canal therapy. 3rd ed., Philadelphia, Lea and Febiger, 1950. 368 p. (p. 305–6.)

5. *Treatment of Teeth with Infected Pulps*

1. In an acute abscess when the tissues are undergoing swelling and the primary first molar is aching the following should be done immediately:

(*Check the correct answers*)

( ) Inject novocaine into the tissue surrounding the infected tooth to get the tooth prepared for extraction
( ) Insert a lancet into the tissues that are swelling to reduce the pain and swelling.
( ) Paint the tissue surrounding the tooth with iodine
( ) Tell the patient to go home because the swelling and pain will soon subside
(×) Establish drainage through the tooth, and give the child a sedative, and instruct the parent to return with the child for a subsequent checkup

EASLICK, K. A.: Operative dentistry and the three-year-old patient. N. Y. 2nd Dist. Dent. Soc. J., **25:** 495–503, May, 1940.

(−) 2. The success of one's treatment of infected primary molars can be determined without bacterial cultures

EASLICK, K. A.: Management of pulp exposure in the mixed dentition. Am. Dent. A. J., **30:** 179–87, Feb. 1, 1943.

6. *Bleaching Discolored, Devital Anterior Teeth*

(−) 1. Pyrozone is too explosive to be used as a bleaching agent for discolored devital teeth
(+) 2. Thirty per cent hydrogen peroxide is the drug of choice to bleach discolored, devital anterior teeth
(−) 3. The bleaching agent used for a discolored, devital, anterior tooth should be stirred thoroughly with a warmed glass rod
4. Before applying the bleaching agent to a discolored tooth

(*Check the correct answers*)

( ) The incisor should be isolated carefully with trimmed cotton rolls
(×) A rubber dam should be placed carefully to isolate the incisor
(×) All filling material should be removed from the incisor as far as the cemento-enamel junction
( ) The root canal should be packed off with pink base-plate gutta percha
(×) The tooth structure should be dehydrated drastically

5. Following the bleaching of the crown of a discolored tooth to the proper shade, translucency is secured or maintained by

(*Check the correct answers*)

(×) Filling the pulp chamber with a light colored siliceous cement
(×) Saturating the dentinal tubules with an 80 per cent solution of chloral hydrate
( ) Repeating the bleaching at 3-month intervals throughout the succeeding year
( ) "Scrubbing" the labial surface with a ten per cent solution of hydrochloric acid
( ) "Painting" the dried surface with a synthetic resin varnish

Ostrander, F. C.: Steps in bleaching teeth. Ann Arbor, University of Michigan, 1950. 1 p. processed.
Grossman, L. I.: Root canal therapy. Philadelphia, 3rd ed., Lea and Febiger, 1950. 368 p. (p. 243–7.)

7. *Root Curettement and Resection*

(+) 1. One criterion of success, following the root resection of a young permanent central, is the re-establishment of a layer of cementum
(−) 2. Bone loss around the apex of a tooth indicates an area of infection
3. If one detects a radicular cyst radiographically around the apex of a maxillary central incisor, in a 12-year-old, in which the root canal has been properly treated and filled,

(*Check the correct answers*)

( ) The radiolucent cystic area should be checked periodically by radiographs to see if it gradually is replaced by bony trabeculae
( ) Root resection should be performed at once
(×) Periapical curettage should be performed at once

4. If one detects resorbed areas in the apical portion of the root of a maxillary central incisor, in a 12-year-old, in which the root has been properly treated and filled,

(*Check the correct answers*)

( ) The resorbed areas should be checked periodically by radiographs to see if these areas gradually are filled by deposits of cementum
(×) The root end should be resected at once
( ) Periapical curettage should be performed at once

5. If in the maxillary central incisor of a 12-year-old, one has failed to secure negative bacterial cultures prior to the insertion of the root canal filling,

(*Check the correct answers*)

( ) The root end should be checked periodically by radiographs to see that any radiolucent area gradually is replaced by bony trabeculae

( ) A root resection should be completed at once
(×) Periapical curettage should be performed at once

COOLIDGE, E. D.: The resection of cementum in the presence of injury and infection. Am. Dent. A. J., **18**: 499–525, Mar. 1931.
SOMMER, R. F.: Essentials for successful root resection. Am. J. Orthodont. and Oral Surg. (Oral Surg. Sect.), **32**: 76–100, Feb. 1946.
SOMMER, R. F., AND RICHARDS, A. G.: Operative and interpretive radiodontics. Ann Arbor, University of Michigan, 1949. 41 p. processed.

8. *Fractured Roots*

(+) 1. If the root of a maxillary central incisor of a young patient has been fractured and the coronal segment is tight, no treatment is indicated except periodic vitality tests
(+) 2. Vitality returns to many teeth that have fractured roots
(+) 3. If the root of an anterior tooth is fractured and part or all of the fracture line occurs within or passes through the gingival crevice, union of the fragments seldom, if ever, occurs
(+) 4. If the root of an anterior tooth is fractured and the coronal segment is loose and subject to continuous movement, then the coronal fragment is stabilized just out of occlusion with ligatures

HARTSOOK, J. T.: Management of young anterior teeth which have been involved in accidents. Am. Dent. A. J., **37**: 554–64, Nov. 1948.

9. *Displaced and "Knocked-Out" Teeth*

(+) 1. Primary teeth that have been driven rootwise into the alveolar process as the consequence of an accident often will re-erupt, align, and stabilize themselves without treatment
(−) 2. Young permanent incisors which have been loosened by an accident and then stabilized with wires require approximately three months to become firm in their sockets
3. In a nine-year-old, prior to replanting a central incisor which was knocked out completely 30 minutes previously, the operator should

(*Check the correct answers*)

( ) Leave the root canal undisturbed in anticipation of regeneration of the pulpal blood and nerve supply
(×) Fill the root canal with a permanent, well-adapted filling of root canal points and paste
(×) Leave undisturbed any pericemental tissue
( ) Carefully remove any attached pericemental tissue
(×) Cleanse the root surface with a mild antiseptic such as soap and water
( ) Cleanse the root surface with an escharotic drug such as phenol or tincture of iodine

4. After replanting a central incisor in a nine-year-old, one should

(*Check the correct answers*)

(×) Splint the replanted tooth in position until it becomes stabilized
( ) Cut off the root tip to make sure the tooth is seated in its socket so that stabilization is unnecessary.

5. If the replantation of a central incisor in a nine-year-old has been managed scientifically, the operator may expect that

(*Check the correct answers*)

(×) The tooth promptly will become firm in its socket
(×) Normal continuity of the lamina dura will develop

(×) The periodontal membrane will retain or regain normal thickness
(×) There will be no radiographic evidence of root resorption within two years
( ) In two years ankylosis of the root may be detected radiographically

HARTSOOK, J. T.: Management of young anterior teeth which have been involved in accidents. Am. Dent. A. J., **37:** 554–64, Nov. 1948.

MAXMEN, H. A.: An aid in successful replantation and a post resection canal filling technique. Mich. S. Dent. Soc. J., **27:** 118–23, June 1945.

Ammoniacal Silver Nitrate: A Study of its Value in Operative Dentistry Today

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Editor's note:

Ben Rabinowitch is a Detroiter, gone Californian, but withal, a pretty nice fellow! After graduation from the U. S. C. dental school in 1937, and a year's interneship at Forsyth Dental Infirmary in Boston, Ben returned to U. S. C., where he taught part-time until this past year, when the pressure of private practice became too strong to resist. Member of the Academy of Pedodontics, Diplomate of the Board of Pedodontics, active in the S. California Unit of A. S. D. C., author of several papers, clinician, Omicron Kappa Upsilon member—and apparently an active man, Ben is also the outstanding man—weightwise—at most pedodontic gatherings! But perhaps that's why he is so easy to get along with and such good company, according to his friends.

The accompanying paper deals with a subject we've been kicking around for years—silver nitrate precipitation, and presents an accumulation of the best data and opinions available at this date.

A. E. S.

INTRODUCTION

THIS investigation involves a clinical, roentgenographic and histological study of the use of silver nitrate (ammoniacal) in operative dentistry. The material studied is from primary and permanent teeth of many individuals where silver nitrate was used during the course of clinical procedures.

A survey of the literature shows that while controversy exists it is due mainly because of the different approach by various authors. While some were studying its value as a cavity sterilizing agent others were studying its value in erosion, caries control, gingivitis, and pulp therapy. By adding subjective armchair deductions and an aversion by some to the discoloration there has been some disagreement that must be settled scientifically.

While silver nitrate has been used for over one hundred years, it was not until *Howe* (17 & 19) added ammonia water, that it was made alkaline with a pH of 8.5 to 9.5 when fresh. He used this solution to deposit free silver in the sterilization of disintegrating dentin and decalcified enamel. He also found that tissue was very tolerant to the solution. *Nesson* (24) discussed silver nitrate with special reference to the sterilization of dentin in primary teeth.

Woodle (28) presents a study of the treatment of Howe's silver nitrate in infected pulps. He states that the physical principle which carries the solution into the tubuli and to the apical end is capillary attraction. He showed that the silver nitrate does not coagulate infected organic matter, but it does coagulate albumin at the point of contact with sound tissue, preventing its penetration into healthy structure.

Aiguier (30) suggests that silver nitrate is of value in the treatment of fissure prophylaxis.

Cleary (30 & 47) is one of the first to suggest the use of this solution to disclose caries and that it has two valuable actions. One, to sterilize dentin and two, to seal the tubuli and to keep the seal intact. He also suggested its value in fissure prophylaxis.

Gordon (31 & 33) presents a history of its use since 1846 in dentistry and describes its action. He also states that because of its oligodynamic properties it inhibits bacterial growth.

Prime (35, 37, 38, 40 & 47) discusses most of the phases of silver nitrate from the clinical standpoint but stresses its value in treatment of incipient caries and its use as a disclosing solution. He showed the lack of value when the reducing agent is applied first.

Hill & Arnold (37) show that after a treatment of silver nitrate enamel becomes more resistant to the action of weak organic acids.

Ippolito (37) besides presenting the uses of silver nitrate previously mentioned, advises its use in inhibiting sensitivity due to erosion.

Ireland (39 & 42) suggested that since silver nitrate is such a good sterilizing agent of infected dentin, it could be left thereby reducing the incidence of carious pulpal exposure.

Graham (41) presents the value of silver nitrate by its ability to sterilize disintegrating dentinal structure and to neutralize the acid reaction of dental caries. Sterilization is the result of action of metallic silver upon the proteins of bacteria in the decayed tooth structure. He also confirmed the pH at 8.5 to 9.5.

Zander (41) presents an excellent paper on the history of the scientific data and research on silver nitrate and concludes that:

1) Silver nitrate should be used routinely in all cavities where appearance is not important.

2) Silver nitrate should not be depended upon to prevent an exposure, and that all caries should be removed.

3) The use of silver nitrate as a disclosing agent for superficial decalcifications of enamel is of great value; apparently it arrests decay for some time.

Seltzer & Werther (41) in their studies show that silver nitrate cannot be held responsible for pulp devitalization. It aids in the retention of the tooth by giving pulp tissue time to lay down secondary dentin.

Entelis & Feinstein (42) found that silver nitrate penetrates to the base of the carious area and no extension of caries was found in the tubuli previously treated.

Klein & Knutson (42) studied the effect of silver nitrate applied topically. Their conclusion differed slightly from Gottlieb and his followers.

Zander & Burrill (43 & 45) found that silver nitrate penetrates sound dentin—may be carried by a tissue fluid after penetration. This further penetration does not injure the pulp nor irritate it.

Sebelius (43) shows a minute difference in the course of caries with silver nitrate coagulating the albumin forming an albuminate and also shows penetration of the silver nitrate to the depth of the caries.

Besic (43) has shown that when the carious lesion is sealed there is no need for sterilization except in very deep cavities and then only to eradicate a possible bacterial growth that may eventually injure the pulp. However, he emphasized, in no case studied was there any further progress of decay.

Peterson (43) demonstrated the value of silver nitrate in the treatment of a gingivitis.

Basco (46) in presenting a resume of the research work done, points out that clinically, for almost a century, silver nitrate was used to arrest caries, that it unites with the enamel to form a more insoluble compound. This was more recently confirmed by Gottlieb and others though its value in clinical practice must still be proven. He points out that little if any significant pulpal changes occur. There are still some men who contend, without evidence, that the dental use of silver nitrate destroys the vitality of a tooth.

Material and Methods

The material used in this study consisted of primary teeth in varying stages of resorption. Some of the teeth were extracted prior to normal exfoliation for experimental study. All of the teeth studied that were treated had the silver nitrate applied In Vivo for one minute and were reduced for one minute. The ammoniated silver nitrate used was prepared according to the formula of Dr. Percy R. Howe. Eugenol was used as the reducing agent in all operative procedures. *Marshall* (33) found eugenol less irritating than formalin. Formalin was used as the reducing agent in cases of fissure prophylaxis; it was not used in the internal portion of the tooth because of its possible irritating effect.

The teeth were fixed in 10% formalin. The decalcifying agent used was 10% nitric acid in formalin. The teeth were prepared for sectioning by the paraffin method and were cut into sections of 3 to 20 microns thick.

Some sections were counterstained with Hematoxylin and Triosin while others were available for observation of just the silver nitrate.

Observations

Caries

The studies of fissure prophylaxis were made on permanent teeth and no sections were made. On the basis of x-ray evidence, all cases where the fissures were widened and cleaned out showed no further evidence of a carious lesion.

In decalcified areas an interesting phenomenon was observed. There was no further caries in enamel previously treated with ammoniacal silver nitrate. However, surrounding enamel, in some cases, showed evidence of caries when allowed to go untreated; this eventually reached the dento-enamel junction and spread laterally. In some cases an island of "sound" treated enamel was found.

Treatment of caries in the dentin was studied and had to be divided into two groups. Group 1 had had silver nitrate applied shortly before the tooth was obtained for study. Group 2 had had silver nitrate applied over 6 months and as much as 10 years prior to the specimen being obtained for study.

In group 1 which had recent silver nitrate application, penetration was observed "en masse" to the depth of the decalcification and possible bacterial invasion (Fig. 1.). In high power microscopic sections an occasional tubule had further penetration (Fig. 2.).

In group 2, teeth that were treated with silver nitrate for over six months prior to study, penetration was observed "en masse" to the depth of decalcification with further extension visible under low power magnification along the tubuli, even to the pulp. (Fig. 3. and Fig. 4 high power).

In two cases studied where the eugenol had been applied first there was only surface penetration.

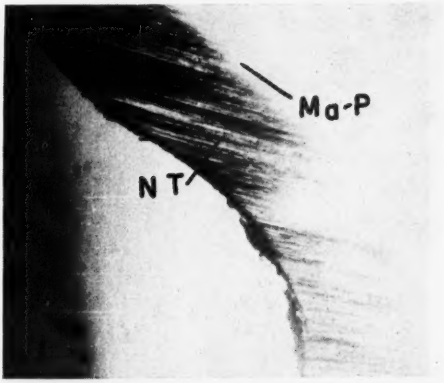

FIG. 1. Penetration of the Silver Nitrate "en masse" after recent application. NT, Silver Nitrate in Tubuli; Ma P, Mass penetration. ×20

FIG 2. Higher magnification of the section shown in Figure 1. ×200

As by previous investigators, penetration was observed "en masse" to the limit of decalcification which continued on until the pulp was reached with no apparent damage to the pulp tissue. This was apparent in teeth with or without secondary dentin formation or other calcific barriers, and was also reported by *Zander and Burrill* (43). However, silver nitrate particles were not found in pulp calcifications.

All tubuli that were treated achieved the bluish color that is commonly associated with silver nitrate. Teeth that had their root canals treated with silver nitrate themselves approached the bluish tint. This is due to the reduced silver particles in the tubuli. No visible effect was noted in the odontoblastic layer where silver nitrate was applied in deep seated cavities, and the formation of secondary dentin was almost always observed.

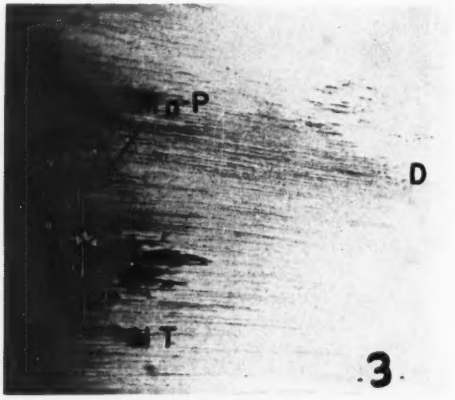

FIG. 3. Penetration of the Silver Nitrate six months or more after application. NT, Silver Nitrate in Tubuli; Ma P, Mass penetration: D, Dentin. ×40

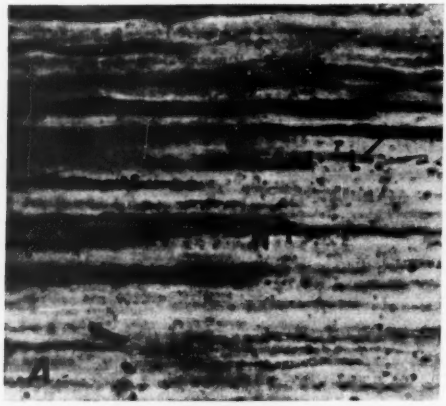

FIG. 4. Higher magnification of the section shown in Figure 3, around the area D in the dentin showing further extention of the Silver Nitrate. ×200

Pulp Treatment

Pulp capping using silver nitrate has been attempted by several groups. While this study does not encompass pulp capping, a study was made by Rabinowitch and Jones at the School of Dentistry, University of Southern California almost 8 years ago. Cases selected were large carious exposures without evidence of putrescence which under ordinary clinical procedures would be condemned. Caries around the exposure

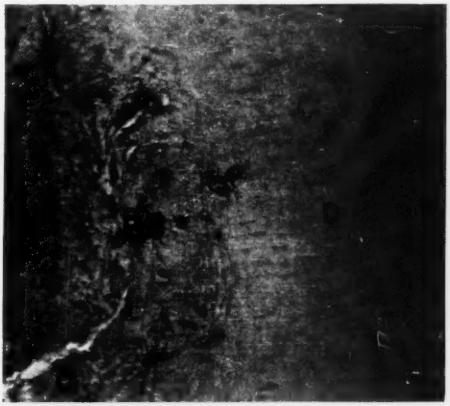

FIG. 5. Bone repair in a tooth treated with Silver Nitrate as a routine in root canal therapy on a primary tooth. BR, Bony repair; D, Dentin. ×775

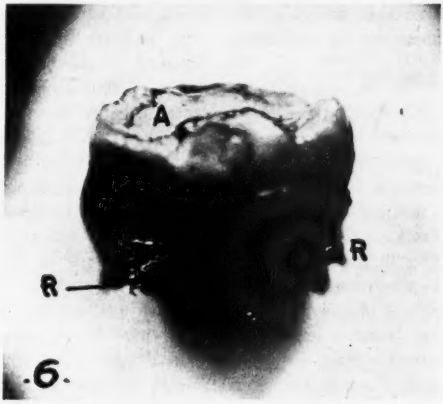

FIG. 6. Normal resorption of a tooth that had no permanent successor almost ten years following pulpectomy of an acute periapical infection. A, Amalgam restoration; R, Resorbed roots.

was carefully removed and the cavity washed and dried. Eugenol was applied for one minute followed by silver nitrate for one minute. While results showed some value in maintaining the vitality of the tooth and enabling formation of secondary dentine, the results did not justify this treatment in preference to newer technics.

The value of silver nitrate in root canal therapy was observed clinically in over 1300 cases with but 7 known failures. Histologically the silver nitrate is seen to penetrate the tubuli from within going outward and in some cases reaching the periodontal membrane. When the case presents resorption of bone due to infection the silver nitrate penetrates the granulomatous tissue and sterilizes it thus allowing for bony repair and healing of the root (Fig. 5). Normal resorption is observed in primary teeth following successful pulp therapy (Fig. 6). Complete details and technics are contained in a paper to be reported.

Discussion

While many investigators have studied the application of silver nitrate to the teeth in routine operative procedures, controversy has existed as to the effect on the enamel, dentin and pulp.

Since no penetration of caries into dentin was observed in fissures treated with silver nitrate after they had been made self-cleansing and polished, a comparison to operative technics leaves the value of this treatment over a typical restoration in doubt. Since it has been shown by *Aiguier, Cleary, Basco, Gottlieb* and others, that this treatment seems to make the enamel more insoluble and thereby more resistant to the caries attack, it may be used with the idea of prevention similar to the fluoride treatment now accepted as having some value.

Silver nitrate has proven to be very effective in decalcified enamel areas and leaves them not only resistant to the carious process, but also plugs the decalcified tubuli. However, once the decalcification and resultant caries has penetrated the enamel and reached the dentin, the caries must be removed by instrumentation and the tooth restored with a suitable filling material. Silver nitrate cannot be depended upon completely to spread laterally as it can along the tubuli.

The sterilizing effect of silver nitrate in the dentin whether deep or shallow is shown beyond question when the silver nitrate is applied first. When the eugenol is applied first, there is some slight surface deposition noted and apparent penetration; however this is never seen to the depth of the carious decalcifications. Teeth that had been treated for a longer time showed further penetration and plugging of the tubuli. It can now be accepted that silver nitrate will penetrate calcific barriers and secondary dentin. Whether this continued penetration is carried by a tissue fluid or is merely migration along physiologic channels is as yet unknown. However, in the light of this investigation which confirms the work of *Zander* and his associates as well as *Prime, Seltzer & Werther* and others, it is now certain that there is no harmful effect on the pulp if there is the least amount of sound dentin between the carious area and the pulp. If no sound dentin is present, the silver nitrate will penetrate to the pulp and coagulate the albumin by its escharotic effect, causing pain.

Because of the caustic effect on pulp tissue silver nitrate is not practical as a

pulp capping material. It is, however, very effective in the treatment of root canals both as a sterilizing and mummifying agent as well as an aid in plugging the minute foramina and accessory canals. (Details to be published.)

This paper is not intended to enter the controversy of the value of silver nitrate in caries prevention by the impregnation technic. The author merely wishes to bring out the fact that an analysis of the effects of silver nitrate shows its potential value but that this technic needs further investigation.

One cannot discuss the value of silver nitrate without commenting upon the hazard of discoloration. There is no way completely to remove the discoloration from the tooth as it follows the tubuli. One can only suggest that judgement be used in deciding whether the use of silver nitrate be the treatment of choice. When indicated, one must conclude that silver nitrate has a definite place in dentistry today.

Summary

1. The value of silver nitrate was studied in various phases of dental practice.

2. In areas showing slight decalcification of the enamel, silver nitrate was found to arrest the carious process by impregnation and causing the surface to be more resistant to further decalcification.

3. Because of its impregnation into the tubuli it was found to be a good means of sterilizing and plugging the tubuli to prevent reoccurrence of the carious process in that region.

4. Due to the mummifying effect on pulp tissue and because it plugs the minute foramina, it is a good treatment in pulpectomy.

5. Silver nitrate was found not to harm the pulp if there was a minute portion of sound dentin protecting the pulp.

6. Silver nitrate has a definite place in the present dental armamentarium.

5720 Wilshire Boulevard

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Around the Country

Items of interest for this column should be sent to Dr. Laren Teutsch, Editor, 4201 Farnam St., Omaha 3, Nebraska.

Roy M. Wolff, of St. Louis, Missouri appeared as essayist before the Illinois State Dental Society, on May 9th, on the subject of dentistry for children. Paul H. Brown of Chicago, L. I. Webb of Harrisburg and Roy C. Kolb of Mascoutah, presented table clinics at the same meeting. (*Ed. note: Hello, Roy!*)

* * *

Photogenic Philip Phair, now of the A. D. A. personnel, and interested A. S. D. C.'er, spoke before the Illinois Council on Dental Health Education on May 8th, discussing the use of auxiliary personnel in dentistry. Phil and Mrs. Phair are enjoying the growing-up process of their 20 month old son.

* * *

Frank Lamons, of Atlanta, Georgia, reports a successful meeting of the Southern California State Dental Association in April. Frank was in fine fettle for his appearance at the meeting, according to reports!

* * *

Ken Easlick and Helmut Zander participated in a continuing education program at Tuskegee Institute, early in April, with Helmut pinch-hitting for Ken's lectures, as operator of the slide projector.

* * *

The University of Oregon Dental School would like to call to the attention of graduating dental students and practicing dentists interested in Dentistry for Children a one year interneship at Doernbecher Childrens Hospital at the University of Oregon Medical Center in Portland.

This interneship is under the administration of Dr. Harold J. Noyes, Head of the Division of Dental and Oral Medicine, University of Oregon Medical School, cooperating with the Department of Dentistry for Children, University of Oregon Dental School. Most of the interne's time will be spent at the Medical School where he will take courses in Pediatrics, Endocrinology, Anesthesia, Nutrition and at Doernbecher Hospital where he will make ward rounds, give general anesthesia and perform dental operations to in-service and out-service child patients. He will receive practical clinical experience in Pedodontia, Caries Control, and prevention of malocclusion at the University of Oregon Dental School.

The interneship service is for one calendar year starting July 1 and may be applied toward the two years needed to qualify for the American Board of Pedodontics as a specialist in Pedodontia. The interneship carries a stipend of $50.00 per month, plus board, room, and laundry. Direct inquiries to Dr. Harold J. Noyes, Head, Division of Dental and Oral Medicine, University of Oregon Medical School, 3181 S. W. Marquim Hill, Portland 1, Oregon.

* * *

From John Liebold, recent graduate student in pedodontics at University of Michigan, comes a note to join him out

in Phoenix, Arizona where all is sunshine and flowers! John is very happy in his choice of locations and tells us his practice is coming along in good shape. Good luck to you, fellow Capitalian!

* * *

Among the many A. S. D. C. members who attended the meeting of the American Association of Dental Schools at French Lick Springs in March, were the following: George Teuscher, Ralph McDonald, Joe Hartsook, Ken Easlick, Frank Lamons, Dave Law, Jim Kennedy, Jack Pelton, Harold Wittich, Ruth Martin, Al Seyler, Helmut Zander, Hal Addelston, John Fulton, John Brauer, Henry Wilbur, Clarence Hagan, Phil Burwasser and Roy Ellis.

* * *

It is a pleasure to note the recognition accorded Mrs. De Los L. Hill, who was recently selected as Honorary Member of Lambda Chapter of Omicron Kappa Upsilon, the national honorary society of dentistry.

Mother Hill, as she is best known to dental students of Emory University and to many others, has long been a staunch supporter of good dentistry for children, and it was a gift from her in memory of her son, which made possible the De Los L. Hill Jr. Memorial Dental Clinic for Children at Emory.

Congratulations to you, Mother Hill!

* * *

"Dentistry for Children" was the title of a postgraduate course given at Thomas Evans Institute, School of Dentistry, University of Pennsylvania, by Arthur Gabel and Raymond Werther, of the Staff, during January and February. The course was fully attended, and plans have already been made to repeat it next year.

* * *

Congratulations are in order for Doctor and Mrs. Sidney I. Kohn, who announced the arrival of husky Donald William, on April 11, 1951. Sid is a member of our Editorial Board.

* * *

The Dental Assistants Society of the First District, New York, is devoting a large part of its activities this year to the role of the dental assistant in dentistry for children. Joe Kauffmann and H. William Frankel have already appeared on their program, and according to Sylvia Danenbaum, their correspondent, were enthusiastically received. The work of these girls could be an inspiration to similar groups around the country.

* * *

Dr. John M. Frankel, former resident of Winnetka, Ill., director of the departments of pedodontics and dental hygiene at Marquette University, has been named to the board of consultants of the United States Public Health Service.

Appointed by Dr. Bruce D. Forsyth, Washington, D. C., U. S. Assistant Surgeon General and Chief Dental Officer of the Public Health Service, Dr. Frankel will serve in an advisory capacity and will remain on the Marquette dental faculty.

A graduate of the University of Illinois dental school, Dr. Frankel joined Marquette's dental staff in 1949.

* * *

Walter Weisz, of our Pennsylvania Unit, advises us that Editor Al will appear on the program of the Pennsylvania State Society in September, and will also speak to the Pa. Unit at its Annual Meeting.

* * *

We saw a note in the S. California Journal recently which gives credit to Hugo Kulstad, our President, for his alertness and good sense of public relations. Here it is—"Not a single dental journal or text book rests on the shelves of the library of the College of Osteopathic Physicians and Surgeons in Los

Angeles. This was discovered by Dr. Hugo M. Kulstad, Chief of the Division of Dental Health of the Department of Public Health, State of California. At his suggestion and with the assistance of Dr. J. Lorenz Jones, who lectures there on dental medicine, several representative dental journals will be received from now on. Dr. Kulstad, who is untiring in his efforts to integrate dentistry with the other health professions, suggests that some of our members might wish to contribute text books or back volumes of Journals to the College."

Some more of us might be surprised similarly if we were to check up on the libraries of our local schools of medicine and allied professions!!

* * *

Editor Al Seyler sent us a request to acknowledge the accomplishment of the U. of S. California School of Dentistry in beginning erection of its new million dollar, plus, clinic building on March 7, 1951. Dean Robert McNulty, long an active proponent of good dentistry for children, and Floyd Hogeboom, author and lecturer, pedodontist and good A. S. D. C. worker have been hard workers for this project. It is the fulfillment of an ideal—a credit to all those associated with dentistry in Southern California!

* * *

Roy Brooks, new president of our Michigan Unit, was recently elected as Secretary of the Detroit District Dental Society. Roy will be a busy fellow this next year, for he is also chairman of the Children's Dental Health Day of Detroit's Annual Dental Review, in October!

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An Interest Inventory as an Aid in Dentistry for Children

STANLEY R. KORF, D.D.S.

Chicago, Illinois

Editor's note:

Stanley Korf, a graduate of University of Illinois School of Dentistry in 1941, interned at Eastman Dental Clinic at Rochester and now limits his practice to dentistry for children. Stan is active in the Illinois Unit of A. S. D. C. and is completing his term as President this year. We met his pretty wife and two nice children at the Atlantic City meeting and while we learned from them that he works too hard, we also gathered he's a pretty nice fellow to have around!

This article presents a different approach to the problem of learning more about our child patients in order to better understand their behavior—and ours—and it intrigued us no little bit. The procedure would no doubt have to be scheduled to be most useful, but if the case to be handled is a known problem, the time would certainly be well spent.

We think you'll like this article.

A. E. S.

IN OUR efforts to do better dentistry for children, we have until recently put most of our emphasis on the technical procedures of repair. With new knowledge in physiology, bacteriology, chemistry, etc., we have evolved concepts of prevention, but these concepts are still chiefly concerned with the physical and/or organic properties of the teeth and their supporting structures. Stressing the disease instead of the patient in dentistry for adults may be all right, but it seems to this writer that children with their fears, anxieties, reactions, and motivations, are just as important as their caries. For the child is a developing, growing organism, who must be guided, understood, and nurtured in order to help him to reach the best adjustment and crystallization of himself.

If dentistry for children is to become synonomous with preventive dentistry in its greatest and truest sense, then the child must be considered as a totality, for the dental precepts we try to teach our young patients will only be learned and followed if we have their trust, confidence and liking. If a youngster likes and trusts you, he will cooperate with correct and conscientious toothbrushing. He will watch and restrict his sugar diet according to instructions (much more so than the average adult), and he will remind parents when check-up time is due.

These first and early experiences that the child has in the dental office will, to a great extent, determine his mental, social, and emotional outlook toward dentistry during adulthood. Even of more importance, visits to the dental office, if properly conducted, can play a major part in helping a youngster to gain self-control, to accept new responsibilities, and to achieve higher levels of self-reliance.

We now recognize the need for study and research to give us some direction in adapting new procedures to meet the behavior needs of our children patients.

A survey of the literature since 1942 reveals very little dealing with the psychological aspects of dental treatment for children. We appreciate the fact that dental treatment is often painful or uncomfortable, and this unpleasantness is more or less constant in the dental situation. Could we get better cooperation if we knew what the child was feeling and thinking, then offering sympathetic guidance and control in the light of these thoughts and feelings? Could we eliminate some of the pain elements, or at least raise the pain threshhold, if we had more knowledge concerning the child with his fears and anxieties? It would certainly seem so, and this paper will suggest one approach for gaining a better understanding of our young patients.

There are many interlocking and related factors which make the child's behavior pattern in the office difficult to analyze. One factor is the youngster and his personality; another factor is the dentist and his personality (or mood at the moment); and the third factor is the child's home and parents and their influence on him. All these things are reacting on the child, and he is reacting to all of these, so that evaluation sometimes becomes quite difficult.

It is well known that a so-called "problem child" may react like one with a dentist who makes no effort to know and understand him; then behave like the best patient in the world with another dentist who recognizes that the integrity of the child's needs must also be respected. Dentists are still more apt to blame the child for uncooperative behavior than themselves; the fallacy of such blame can easily be proven by referring such a patient to one psychologically competent to deal with children. In a short time, the child becomes pleasant, cooperative, and controlled; then and then only is a good technical dentistry job possible.

Dr. Bell[1] has very aptly described the unique situation which exists in the dental office. The dentist and the child both exhibit great ranges of behavior during the period of treatment, and their relationship may change rapidly in a short period of time. At one moment the dentist may show patience, approval, affection, informing the child concerning progress, etc., thus pointing the way for a pleasant relationship. A few moments later the same dentist may sharply reprove the child, express impatience, threaten him, deny that treatment is painful, etc. This, of course, is a great shift from the common cause and may soon lead to a point verging on hostility. Likewise, the child can shift his emotions rapidly from smiling acceptance to overt rebellion.

Dr. Bell calls this behavior on the plus side "rapport behavior"; that on the negative side "non-rapport behavior," and these may shift from one to the other quite rapidly. The dentist and the child are joint participants in an activity which must be done, and although they may not see eye to eye at all times, they should try to find some basis for working out their problem so that there will be a maximum of affinity between the two. At times, this affinity may wear pretty thin, then discord, opposition, and actual hostility may ensue.

If the dentist can keep the behavior of the child on the plus, or rapport side, most of the time, he will be able to do better work, more quickly, and with a minimum of aggravation and annoyance on his, as well as the child's part.

Now then, how can we best accomplish

[1] Bell, Juliet: "Psychological Aspects of Dental Treatment of Children", *J. Exp. Educ.*, Madison, Wisc., 1943.

this? If, as stated earlier, we understand the child in the light of his fears, repressions, motivations, etc. then the task becomes easier, for with understanding comes patience, tolerance, and a constructive rebuilding of relationships.

It is, however, difficult to understand the child and his behavior at any age level unless we know something of his ideas and interests. When we know something of these, then we can begin to evaluate his responses in terms of the adequacy of his home life, his play life, and his group experiences. Every child has a basic need for success and sympathetic guidance according to his unique nature, and it is up to the dentist to try to find out what these needs are.

As one approach to the problem, an approach which takes very little time and can be used by general practitioners as well as pedodontists, I have formulated a short questionnaire based on the Witty, Koppel, Coomer[2] diagnostic study record. This questionnaire is given to each child before he is seen for the first time in the chair, either the parent or the dental assistant writing down the answers for the younger children. The following questions are asked:

1. When you have an hour or two that you can spend just as you please, what do you like best to do?
2. What games do you like to play best?
3. What would you like to be when you are grown up? What would your father and mother like you to be?
4. What are your favorite radio and/or television programs? First. Second. Third.
5. Do you have a pet? What?
6. Do you like school? Your favorite subject?
7. Suppose you could have three wishes, which might come true, what would be your first wish?
8. Do you dream at night? (Never, sometimes, often) What do you dream about? Are your dreams happy? Are you ever frightened by your dreams?
9. What things do you wonder about?
10. Are you afraid of many things? Name some of the things you fear.
11. Do you enjoy reading? What are the names of some of the books you have read lately?

I would like to present two brief case histories which indicate how the interest chart may help establish and maintain rapport between dentist and child.

Case 1

Mel, age 12, was extremely uncommunicative, not even answering my "hello" or "good morning." He showed little reaction to dental operations and when I would try to be solicitous, at times asking, "Am I hurting you?" or "Is this uncomfortable?", all I got was a shrug or non-committal grunt. He evinced no interest in the office or what I was doing, and I sensed a pronounced dislike on his part for me.

This boy had been to some other dentists. When the mother was asked why, she replied, "He didn't like them." After three visits of this "silent treatment" I felt I was also losing Mel as a patient. Before the fourth visit, he filled out the interest chart. I discovered he built model trains, which is also my hobby. I brought some of mine to the office and compared them with his. We discussed the various types of freight cars, engines, lines, etc. and he became animated and responsive for the first time. We discovered we both had a fear of high places and told each other of a few frightening experiences. He was also interested in radio—I know very little of electronics and Mel was enthusiastic as he explained certain principles to me. These first conversations, naturally, led to others, and the change in our relationship was gratifying to both Mel and myself.

He is now completely at ease, volunteers much information, and seems to enjoy the visits to the office. His mother tells me that for the first time he likes the dentist and looks forward to the next appointment. Such rapport

[2] Witty, Paul and Koppel, D. Interest Inventory in Directing Childrens' Reading. *Educ.*, Vol. 49, 1938.

would never have been achieved, or at least may have taken a long, long time without the aid of the interest chart to help guide me into Mel's personality.

Case 2

Gwen B., now aged 13, was one of the most apprehensive patients I have ever had. She has rampant caries and had not seen a dentist for seven years because of her great fear. Now constant toothaches have made treatment imperative.

At her first visit, she cried when the mouth mirror was introduced, and refused to let me dry the teeth with air. The reaction to a prophylaxis was as severe as if I had attempted to extract a tooth without anesthesia. The second visit went a little better and full mouth x-rays were obtained, but still with great anxiety and fear. All my attempts at rapport conversation were met with crying and obstruction. At the third visit, Gwen filled out the interest chart and seemed to appreciate my concern with making things easier for her. As a result of the questionnaire, I found out that Gwen wants to be a school teacher. Since I am taking courses in Education, we discussed the importance of general and oral health in relationship to teaching. Gwen began to get a better concept of what I was trying to do to restore her mouth to good condition again.

Gwen also paints, and at my request she has made some clever sketches of how she thinks she acted the first few visits. She now admits how unfounded some of her fears were. Gwen also likes serious music and we talked about Brahms and Bach, comparing them with some of our modern composers. We have built up our rapport gradually and Gwen has completely lost her anxiety and fear. She is completely confident in her ability to meet the dental situation now, and is an excellent patient.

These are just two typical cases where in knowing something of the youngster's background and interests we were able to meet on some common basis, so that each experience with each patient was more satisfying to both the child and myself.

We can see then, that it is important to identify children's interests, the development of which gives direction and purpose to their activity, and integrity to their experiences. When we utilize interests, learning takes place concomitantly. Both dentist and child are spared annoyance, frustration, anxiety and aggravation. The use of such a chart enables the dentist to understand the problems that beset the child and to effect friendly sympathetic guidance. Appraising the child's interest has a very desirable effect on the dentist in another way; it makes dentistry for children an exploratory adventure, an ever-changing endeavor to meet the challenges of children who feel free to express themselves in the office.

The use of this questionnaire is merely a beginning in helping to find out why certain children are disturbed in the dental situation. It is offered as a new approach for finding some common ground on which to meet the child, so that he can be put at ease quickly and made to feel that someone is concerned with his needs and interests. Understanding between child and adult is primary, for conduct and behavior is unexplicable without understanding. It would seem logical that this type of questionnaire could be given to each child before treatment is begun so that we can evaluate the child according to his own unique nature and needs, and eventually pre-psychological study would become an integral part of dental treatment.

1525 E. 53rd St.

Operative Dentistry Under General Anesthesia

STANLEY R. SPIRO, D.D.S.*
New York City, N. Y.

UNTIL a child reaches school age, his life, his surroundings, his entire environment is his home. His father and mother are king and queen, his brothers and sisters and occasional visitors complete the enclosed world in which he exists. His first venture into schoolhood and awareness of an association with playmates, visits to the family dentist, the family physician, constitute an important change in environment and influx of strange new experiences. Little preparation can be undertaken for this normal course of events. The child can be guided through this important period of psychological and sociological development, but tact, patience, and understanding should be of utmost concern during the metamorphosis. Minor problems like making friends, accepting school life, and being away from parents offer great new barriers for the normal child. If these comparatively small normalities introduce difficulties it is no wonder that children are bewildered and perplexed on first entering the surroundings of a dental office.

Some patients, particularly children, have not had sufficient experience to stabilize emotional responses and consequently they frequently overreact to situations. It is preferred to avoid any psychic trauma as it has been shown to result in abnormalities of emotional and personality development. The practice of evasive answers and promises of rewards for good behavior is to be condemned as it breaks down the patient's confidence in the doctor, parents and society.

Many advancements in dentistry and medicine have been correlated with the progress in the science of anesthesia. Our concern is for the patient, who because of age, mentality, motor disabilities, emotional disturbance, or type of dental procedure, is unsuitable for routine handling. The problem in successfully managing this type of patient is to utilize a technique of anesthesia and procedure which permits the doctor to operate carefully and successfully in the mouth.

The prerequisites for a set-up for this type of procedure need not be too intricate but certainly should be adequate to meet all the requirements of good technique. Every patient must have a case history, oral examination and physical status estimation of the ability of the patient to withstand the anesthesia. A record of the blood pressure, pulse, heart and lung examination is made preoperatively and recorded on the chart. Consultation with the family physician where abnormalities or irregularities are noted and suggested manner of handling such problems are discussed. The pre-anesthesia preparation of the patient is important. Sedative, hypnotic, and analgesic drugs all tend to reduce the amount of anesthetic agent which is required and thereby increase the margin of safety. The barbiturates act as depressants to the cerebral cortex for allaying apprehension and concern and also tend

* Assistant Visiting Dentist, Triborough Hospital; Adjunct Dentist, Hillside Hospital; Member of the Anesthesia Staff, Queens General Hospital.

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to prevent convulsions occasionally seen under general anesthesia. Atropine or scopolamine are used for their drying effect on the upper respiratory tract. They are also of value in that they prevent reflexly excited activity of the cardiac vagus from deranging the normal gradient of cardiac excitability referred to as ventricular fibrillation.[1]

The stomach should be empty for at least six hours prior to the induction of anesthesia. This lessens the possibility of post-operative nausea and vomiting. An attempt to control starvation acidosis is best handled by giving some glucose derivative or lactose either with premedication or a few hours prior to induction of anesthesia.

The minimum staff involved should consist of an anesthetist, nurse, and operator, whose duties are independently functional. It is suggested and preferred to use the prone position for the patient both for efficiency of anesthesia and procedure. The reason for this is that under mid-first plane stage three anesthesia, the resultant bodily relaxation might otherwise, if in an operating chair, cause interference with respiration and result in a sluggish respiratory exchange.

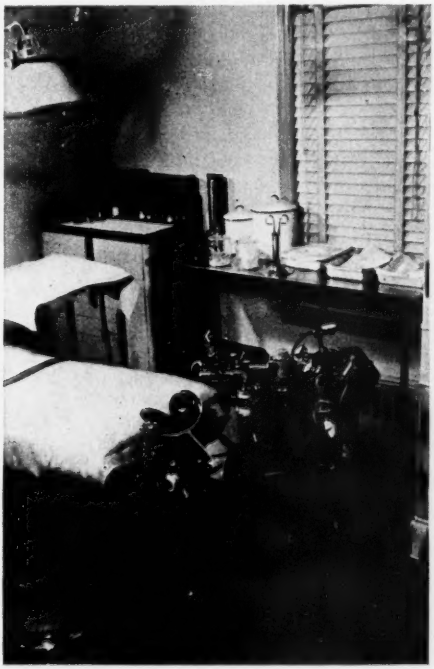

FIG. 1. Office set-up showing converted dental chair and anesthetic equipment.

[1] Gudel, Arthur, *Inhalation Anesthesia*, MacMillan Company, New York, 1937.

We convert the dental chair into an operating table by strapping an examining table or plywood board of correct size to the flattened horizontal chair. The leather cushions are placed on top and covered with a plastic sheet. The advantages of this combination are that the operating table so arranged can be raised or lowered or tilted into any required positions and in addition can be reconverted back to a dental chair.

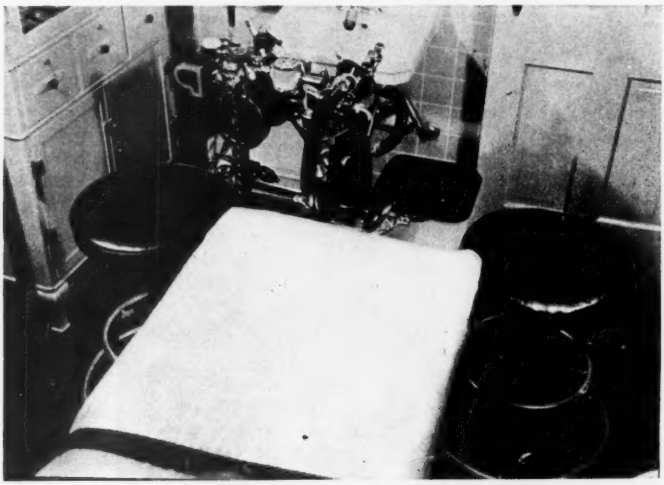

FIG. 2. Seating arrangements for operation.

The patients come to the office having received the pre-medication thirty-five to forty minutes before the scheduled appointment. The nurse escorts the somewhat drowsy patient into the operating room and assists him on to the operating table.

Induction in most patients is with nitrous oxide and oxygen, accomplished with the face mask just off the patient's face, allowing the gas to flow over the nose and mouth and gradually as the patient goes into analgesia to apply the mask more securely and firmly. As soon as the patient shows signs of unconsciousness and approaching third stage of anesthesia, the nitrous oxide (80–20) mixture is supplemented with vinethene. When the signs of mid-first plane third stage anesthesia is reached, the vinethene is shut off and ether started by drip into the rebreathing cannister and bag. The expiratory valve is kept open so as to permit the blowing off of nitrogen and excess of the distended rebreathing bag.[2] The pulse, blood pressure, and respiration readings are marked on the anesthetic record chart, so as to be able to refer to and correct deviations or irregularities of the progress of anesthesia. When the patient is ready for the procedure to be started the switch is made from the face mask to nasal mask. The patient's

[2] Leigh and Belton, *Pediatric Anesthesia*, McMillan Company, New York, 1948.

mouth is opened and a mouth prop is placed between the teeth. The mouth packing is placed as a curtain from the buccal sulcus of one side across the posterior aspect of the tongue and palate to the buccal sulcus of opposite side. Using a closed to and fro system, the N_2O is shut off, a flow of 600–800 cc oxygen is instituted. An ether drip cup (Peterson) attached to the soda-lime cannister is used for giving ether when the need presents itself.

with pentothal sodium is smooth and rapid, and after the relaxed patient goes to sleep the nasal mask is applied and the nitrous oxide and oxygen mixture (80–20) or (50–50) is administered. The sodium pentothal is given intermittently only when necessary, as indicated by patient's requirements. It is suggested to use one or two nasal pharyngeal tubes well lubricated with a 2% nupercaine ointment to promote a better airway. After the oral packing has been placed

FIG. 3. Induction of anesthesia.

When the anesthetic for patients is to be a combination of intravenous pentothal sodium and inhalation nitrous oxide and oxygen, similar pre-medication as for a purely inhalation anesthetic is given. The intravenous set-up can be either a drip method of pentothal sodium or a syringe (50 cc) in a syringe holder containing either a 0.4% or a 1.0% solution. A suitable vein either in the antecubital space or wrist is chosen and vein puncture is made. Induction

in the correct position the procedures are ready to be started.

The operative dentistry is performed first, preparing all the cavities on one side of the mouth, placing the fillings or restorations, and then treating the opposite side in similar fashion. The nurse, during this time, is using the fine aspirator tip to suck up all remnants of tooth dust, ZnO and eugenol paste, cement, amalgam, or porcelain excess particles, which would otherwise fall onto the gauze

FIG. 4. Operative dentistry being performed.

FIG. 5. Extractions are done after operative procedures are completed.

packing or tissues of the mouth. This is done to prevent any foreign material from entering the pharynx with possible aspiration into the trachea after the gauze packing is removed. The nurse's other functions are to retract the tissues of the

mouth offering better visibility to the operator and to use the air tip to cool and clean the tooth being treated.

After the operative dentistry has been completed and the gauze packing changed, the required surgery such as extractions, cyst removals, impactions, frenectomy, etc. is performed. With careful packing and continuous and adequate suction, blood and other debris is kept at a minimum. As a precaution, the hypopharynx and larynx are examined with the aid of a laryngoscope in order to suction out any materials which may have slipped past the oral gauze packing.

After the procedures are completed, the patient is placed in the recovery room and left with the nurse for observation and care as he comes out of the anesthetic.

In conclusion, a technique for the handling of this type of patient, where the usual routine methods have failed or been deemed inadvisable, has been offered. It is to be remembered that all patients, regardless of their difficulties or disturbances, are entitled to dental treatment along with the average individual, and as members of the healing arts we must recognize our challenge and responsibility.

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A jacket as white as your mommy's clean sheet
He wears, buttoned up so nice and so neat.

He says "Just hang your coat over there,
And come have a ride in my movable chair."

You sit in the chair and he pumps you up high,
Until you can look him right in the eye.

Or he might take a picture, and then he can view
Your tooth in and out—it's an x-ray of you.

The box in the corner with the silvery sheen,
The sterilizer, it keeps the instruments clean.

The explorer is just like you—big and so brave,
And inside your mouth it explores, in a cave.

His hand mirror helps him look up instead
Of having to do it and stand on his head.

Then there's his light that helps keep your mouth lit,
But it never gets in your eyes one teeny bit.

Of course, there's the drill that just dances along,
And takes out decay as it sings you a song.

The doctor will mix up some paste with a grin,
Then buzz goes the motor as the toothbrush goes in.

And he'll say, "We will clean them real good this way,
But you must keep brushing them well to prevent decay."

The chair will go down, you'll shake hands with your friend,
And your trip to the dentist will come to an end.

Mrs. Oscar Stadtler
485 E. 115th St.
Cleveland 8, Ohio